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ABSTRACT

A study evaluated the effects of attribution training combined with spelling strategy training on spelling performance, strategy transfer, and effort attributions. Subjects, 43 adolescents with learning disabilities in grades 7 and 8, were stratified by grade level and randomly assigned to one of three experimental conditions: spelling strategy training, spelling strategy plus attribution training, or a traditional study control condition. Individually administered training sessions, conducted over three consecutive days, provided instruction in a 5-step study strategy including explicit training for strategy transfer. Spelling performance was assessed across the training days and on an unprompted generalization task that occurred one week following instruction. Significant differences emerged on spelling recall scores across the training days favoring the strategy attribution condition. No performance differences emerged on numbers of words learned or strategy usage on the unprompted generalization task nor on posttest numbers of effort attributions. (Contains 31 references and 3 tables of data.) (Author/RS)

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The Effects of Spelling Strategy Training With/Without Attribution Training

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Abstract

This investigation was intended to evaluate the effects of attribution training combined with spelling strategy training on spelling performance, strategy transfer, and effort attributions. Forty-three adolescents with learning disabilities in grades seven and eight were stratified by grade level and randomly assigned to one of three experimental conditions: spelling strategy training, spelling strategy plus attribution training, or a traditional study control condition. Individually administered training sessions, conducted over three consecutive days, provided instruction of a five-step study strategy including explicit training for strategy transfer. Spelling performance was assessed across the training days and on an unprompted generalization task that occurred one week following instruction. Significant differences emerged on spelling recall scores across the training days favoring the strategy attribution condition. No performance differences emerged on numbers of words learned or strategy useage on the unprompted generalization task nor on posttest numbers of effort attributions.

The Effects of Combined Strategy/Attribution Training

Spelling skill influences the process of written language which in turn impacts academic performance across content areas. It has been well-documented that students with learning disabilities (LD) frequently exhibit deficits in spelling skill (Graham & Miller, 1979; Graham & Stoddard, 1987; Poplin, Gray, Larsen, Banikowski, & Mehring, 1980). In fact, some researchers have delineated spelling performance as the most powerful discriminator between students with LD and other low achievers (Deshler, Schumaker, Alley, Warner, & Clark, 1982).

It is not surprising that spelling problems are common to students with LD when one considers that this population frequently exhibit problems: (a) with language-based information (e.g., Kail & Leonard, 1986; (b) in phonological awareness (Mann, 1986); (c) in the employment of conscious memory strategies (Ceci, 1985) and (c) the transfer of learned strategies to other appropriate contexts (Groteluschen, Borkowski, & Hale, 1990). In addition, these students may exhibit maladaptive attributional beliefs, (Dweck, 1986; Stipek & Weisz, 1981) such as attributing academic outcomes to factors outside their control (e.g., luck) rather than to self-self-determinable variables such as effort and effective strategy use. Consequently, the academic difficulties of students with LD may be compounded by poor motivation and diminished effort.

Students with LD have been described as users of ineffective strategies (Swanson, 1989; Torgesen & Licht, 1983) for tasks

including the independent study of spelling (Graham & Freeman, 1985; Singh, Farquhar, & Hewitt, 1991). It is encouraging, however, that the spelling performance of these students does improve following instruction to employ systematic spelling methods (Fulk & Stormont-Spurgin, in press). To illustrate, Graham and Freeman (1985) trained ten-year-old subjects to employ a 5-step study technique under three conditions that varied only in levels of teacher direction. No differences resulted among the three study conditions; however, each training condition demonstrated improved performance over that of an independent-study control condition.

However, little spontaneous transfer of trained spelling strategies has been observed to occur (Gerber, 1986). Some researchers posit that LD students' failure to spontaneously transfer learned strategies may result from maladaptive attributional beliefs (Borkowski, Johnston, & Reid, 1987). Attributions, which are the explanations that individuals construct to explain performance outcomes (Weiner, 1979) may be either adaptive (i.e., conducive to motivation) or maladaptive (i.e., detrimental to motivation). For example, Kurtz and Borkowski (1984) found that students, who attributed success to effort and strategy use, exhibited greater cognitive and motivational gains from strategy training than did students who held less adaptive attributional beliefs. Borkowski, Weyhing, and Carr (1988) and Kurtz, (1989) found that attribution training resulted in enhanced strategy transfer over subjects who received strategy training

alone. In addition, Borkowski, Weyhing, and Carr (1988) found that only students who received attribution retraining concurrently with reading strategy instruction maintained improved performance on a delayed measure; students who received strategy training alone did not maintain improvement over time.

More recently, Okolo (1992) found that students who received attribution training combined with CAI multiplication drill exhibited significantly higher multiplication scores at posttest than students who received CAI drill with traditional feedback. However, attribution training did not result in group differences when combined with training to transfer a mnemonic (i.e., memory-enhancing) keyword strategy (Fulk, Mastropieri, & Scruggs, 1992). In this instance, explicit training of the powerful keyword strategy appeared to be the more significant factor. Consequently, questions remain regarding the efficacy of attribution/strategy retraining. Reports of attribution training combined with spelling strategy instruction have not occurred in the literature to date. This is unfortunate because spelling study, which may be regarded by students with LD as a monotonous task, appears likely to be enhanced by persistence and consistent strategy use. The two purposes of this investigation, therefore, were to (a) provide spelling strategy training with and without attribution retraining and (b) to evaluate the effects of attribution training on spelling performance and independent strategy use on an unprompted transfer task.

The following questions guided this investigation: Will

attribution training enhance spelling performance when combined with spelling strategy training? Will attribution training facilitate unprompted strategy and greater persistence (e.g., study time) on a delayed transfer task? Finally, will attribution training result in greater numbers of positive attributions for spelling outcomes? The next section describes the subjects and design of the investigation.

Method

Subject Description

Forty-three adolescents (92% caucasian and 8% black) were subjects in this investigation. All students were receiving resource services for LD following referral, assessment, and placement conducted in accordance with federal and state guidelines including evidence of a severe discrepancy between potential and achievement. In addition, all subjects had been identified by their special education resource teachers as being poor spellers. Subsequent to parental permission, the sample included 30 males and 13 females (mean age= 14.5). Two subjects were expelled from school which prevented data collection on Days 3 and 4 of the intervention. The IQ scores for the sample were as follows: verbal IQ, M=91, SD=10.1; performance IQ, M=94.3, SD=13.5; and full scale IQ, M=91.7, SD=10.6. Subjects had been receiving special education services for LD for M=4.9 years, SD=2 years and spent approximately 39% of their school day in resource classes, SD=19%. Subjects' spelling achievement standard score was M=78.3, SD=12. Additional subject information is found by condition in Table 1. The next

section describes materials common to all conditions followed by descriptions of condition-specific materials.

Insert Table 1 about here

Materials Common To All Conditions

Training phase, Days 1-3. Across conditions, Days 1 through 3 consisted of 25-minute sessions devoted to the instruction and prompting of condition-specific spelling strategies. Materials employed across conditions included spelling pretests and posttests, target word lists, and condition-specific scripts to standardize treatment and to control instructional time across subjects. Manila envelopes contained materials for all subjects each day of the intervention.

Target words (10 on Day 1, 13 on Days 2-3) were selected from Working Words in Spelling (1990), levels 6 and 7 through the following criteria. Words and meanings were judged by the experimenters to be familiar to most LD adolescents whereas spellings were judged to be unfamiliar (e.g., mosquitoes, license). Words were printed in 1/2" boldface type with five words per 8 1/2" by 11" page. Materials specific to each condition are described below.

Spelling Strategy Condition

Materials for this condition included a rule card, script, and student booklet to teach the five-step study strategy employed by Graham and Freeman (1985). One 8 1/2" by 11" card contained the

following study steps: (1) say the word; (2) write and say the word; (3) check your spelling; (4) trace and say the word; and (5) write the word from memory and check it.

Experimenter scripts described the purpose and procedures for strategy employment as well as prompted recall of the strategy steps. Student booklets in this condition consisted only of lined notepaper for written practices.

Spelling Strategy Plus Attribution Training Condition

Spelling strategy materials for this condition were identical to those described above for the spelling strategy condition. In addition, attribution training materials, designed to parallel those of Borkowski, Weyhing, and Carr (1988) and recently employed by Fulk, Mastropieri, and Scruggs (1992) were also utilized. These materials consisted of two cartoons, two printed rule cards, and experimenter scripts. Each cartoon was printed on an 8 1/2" by 11" card. The first cartoon portrayed a student who had experienced success on an academic task and the second portrayed a student who had experienced failure. Two positive (i.e., controllable) attributions for success and failure were also printed on 8 1/2" by 11" cards. The positive attributions for success were: Two reasons students usually do well in spelling are: (1) because they know a good way to study spelling, and (2) they try hard. The positive attributions for failure were: Two reasons students usually don't do well in spelling are" (1) because they don't know a good way to study spelling, and (2) they don't try hard.

Traditional Study Control Condition

Materials for this condition included a rule card, experimenter script, and student booklet. The 8 1/2" by 11" card listed the following traditional study methods: (1) verbal rehearsal, (i.e., repeat the letters) (2) written rehearsal (e.g., write the words three times each); (3) sentence practice; and (4) orthographic spelling puzzles.

Experimenter scripts explained the purpose and procedures for each study method. Student booklets in this condition contained orthographic puzzles prepared for each target word and lined notepaper for written practices.

Dependent Measures

The following dependent measures were employed across conditions: daily spelling pre and posttests and attribution assessments (pre- and post-intervention). Subjects' study time and strategy use on the Day 4 generalization task were also recorded.

Daily spelling measures. Pretests and posttests were employed to measure correct spellings of target words each day of the intervention. Target words were presented in varying randomized order. Numbered lined notepaper was provided for student responses.

Strategy data and study time. Subjects' study time and strategy use on the unprompted generalization task (Day 4) were observed and recorded. The next section describes procedures common to all conditions for each phase and day of the intervention followed by condition-specific procedures.

Attributions assessments. A pre and post intervention attribution measure was developed to parallel a measure employed by Borkowski and colleagues (e.g., Borkowski, Weyhing, & Carr, 1988) and more recently employed by Fulk, Mastropieri, and Scruggs (1992) to measure effort attributions. This measure consists of sixteen hypothetical scenarios (eight success and eight failure) common to junior-high students. Subjects are asked to rate the likelihood that each event occurred due to luck, effort, ability, help, or task difficulty. For example, one item was, "Suppose you got all the answers right on your weekly spelling test. How much would this be due to luck ("none", "a little", "some", "a lot")? "How much would it be due to how hard you tried?" ("none", "a little", "some", "a lot")?

Design and Procedures

Training Phase

This section first describes procedures common across conditions followed by descriptions of condition-specific procedures.

Day one. Students entered a quiet classroom adjacent their resource classrooms, were stratified by grade level, and randomly assigned to one of three experimental conditions: spelling strategy training, spelling strategy plus attribution training, or a traditional study control condition. First, one of three experimenters licensed to teach in special education, introduced herself and explained the purpose of the study. Second, following subjects' informed consent, the attribution pretest was

administered. All items were read aloud to subjects and responses were recorded by the experimenter. Third, subjects were informed that they would be studying spelling words with a specific study method and that a spelling quiz would be administered following the study session. Fourth, a sample item was presented according to condition and a sample recall measure was administered. Fifth, the ten target spelling items were instructed in ten minutes with procedures that varied by condition. Sixth, a ninety second "filler" task was presented (i.e., subjects were asked to write information such as their grade, birthdate, teacher's name, etc.) followed by the untimed spelling posttest. Finally, subjects were thanked for their time, asked not to talk with classmates about the study procedures, and returned to their classrooms.

Days two and three. Sessions began with three minutes of review of relevant study procedures. Second, it was stressed that the study procedures were appropriate for use across spelling study situations. Third, direct instruction and questioning regarding the study strategy were provided (e.g., "What is the first step of the study strategy?"). Fourth, students were provided with 13 target words, instructed to study for 12 minutes, and coached through the study strategy as needed. Following the 90-second filler and untimed spelling posttest, subjects were thanked for their time, reminded not to share information with classmates about study procedures, and returned to class.

Day 4 Generalization Task

Day 4 of the intervention was an unprompted generalization

task consisting of a novel 13-item word list. Procedures for this task did not differ among conditions. First, the experimenter read the target words with subjects and offered additional reading assistance. Second, subjects were instructed to study independently and asked to indicate when they were prepared for the posttest. Following the 90-second filler activity, the daily spelling posttest and attribution posttest were administered. Condition-specific procedures for the training days are described in the next section.

Spelling Strategy Condition

Day one. Following the attribution pretest, subjects were informed that they would be taught to employ a 5-step spelling study method. Second, students employed the 5-step strategy with a sample word and were provided with strategy feedback. Third, the target list was presented with strategy coaching as needed. For example, subjects were asked "What's the fifth study step?" "Right, you write the word from memory." Subjects studied each target word and used any time remaining to repeat the strategy with words they perceived to be more difficult.

Days two and three. The first three minutes included a review of: (a) the 5-step study strategy, (b) situations for which the strategy would be appropriate, and (c) Day 1 success employing the technique. The timed study session (i.e., 12 minutes) was followed by untimed administration of the spelling posttest. Next the procedures for the strategy plus attribution condition are described.

Spelling Strategy Plus Attribution Training Condition

Day one. The spelling strategy procedures for this condition were identical to those employed in the spelling strategy condition described above. In addition, attribution training was provided through the following procedures. First, the importance of attributing success and failure to controllable causes, particularly to effort was explained through the cartoons and materials described in the materials section. Second, following each subject's correct written rehearsal, success was attributed to effort and to effective strategy use. Third, subjects' were prompted to provide positive attributional feedback. For example, the experimenter asked, "Why do you think you spelled that word correctly?" "Right, you tried hard, used the study strategy, and spelled tne word correctly." Following an incorrect spelling, subjects were reminded to try hard and to repeat the study steps.

Days two and three. Attributional training proceeded on Days 2-3 through the following. First, the importance of positive attributions were reviewed prior to the spelling study session. Second, students were given combined strategy-attribution feedback following spelling practices (e.g., "You tried hard, used the study strategy, and spelled the word correctly."). Third, students were prompted to verbalize positive attributional messages (e.g., What should you tell yourself when you spell a word correctly?").

Traditional Study Control Condition

Day one. Following the attribution pretest, subjects were informed that they would be employing several traditional methods

of spelling study. Second, subjects practiced each of the four traditional study methods, listed in the materials section, with a sample word and were provided with feedback. Third, subjects selected one study method and were guided to employ the technique on the target list.

Days two and three. The first three minutes included a review of: (a) the four tradtional study methods, (b) situations for which use of the study mehtods would be appropriate, and (c) students' Day 1 success employing these techniques. As in the other conditions, the timed study session (i.e., 12 minutes) was followed by untimed administration of the spelling posttest.

Scoring

All spelling measures were scored by two trained graduate students, one of whom was blind to subjects' experimental condition. All scoring discrepancies were discussed until 100% agreement was reached. One point was awarded for each correctly spelled word.

Strategy use on the Day 4 generalization task was coded through the following: 0= no strategy use, 1= traditional/ rehearsal, 2= multi-step study. Frequency and percentage scores were calculated for effort attributions across subjects areas and for items specific to spelling tasks.

Attribution measures were scored through the following procedure. Student responses were coded according to the following scale: 'none'= 0, 'a little'=1, 'some'=2, 'a lot'=3. Next, attributions were categorized' as either controllable or

uncontrollable responses and were summed to yield frequency and percentage scores.

Results

Spelling Performance

Training Days 1-3. Means and percents correct for the combined spelling recall measures for training Days 1-3 and the Day 4 generalization task are found in Table 2. Analysis was conducted on raw scores; percents correct are also reported to facilitate interpretation. Posttest data was analyzed for only those subjects' whose daily pretest scores were 50% or less to control for prior knowledge. Data for the training days were summed and entered into a three condition (strategy, strategy-attribution, traditional) analysis of covariance (ANCOVA) using pretest scores as covariates. Statistically significant differences were found for condition, $F(2, 32) = 3.83$, $p=.034$. Although descriptive differences favored the strategy attribution condition, Student-Neuman-Keuls (SNK) post hoc tests were not statistically significant.

Insert Table 2 about here

Generalization Day 4. No significant difference was observed among conditions on spelling performance on the unprompted generalization task, $F(2,36) = .37$, $p=.69$ with subjects recalling similar percents of words across conditions (Table 2).

Study time. No significant differences were observed on the

amount of time that subjects voluntarily studied on the Day 4 task, $F(2,36) = 2.09$, $p = .13$, although descriptive differences favored the control condition. Study times were as follows; control condition, $M = 9.3$ minutes ($SD = 3.2$); strategy condition, $M = 6.6$ minutes ($SD = 3.7$); and the strategy attribution condition, $M = 6.7$ minutes ($SD = 3.7$).

Strategy data. No significant differences were observed among conditions regarding the numbers of students who did and did not employ the strategies trained within their condition on the unprompted generalization task. Numbers and percents of strategies employed by subjects across conditions is in Table 3.

Attribution measure. No significant differences were observed among conditions on posttest effort attributions, $F(2,39) = .978$, $p = .38$ or on effort attributions specific to spelling tasks, $F(2,39) = 1.13$, $p = .33$.

Discussion

This investigation addressed three questions related to the effects of providing attribution training combined with a specific spelling study strategy. First, results supported that students with LD who received spelling strategy plus attribution training did spell more words correctly across training days than did students who received either strategy training alone or training in traditional study methods. Performance differences did not emerge, however, on an unprompted generalization task that occurred one week following the intervention.

Second, attribution training did not facilitate greater strategy usage nor result in greater persistence for study on the

Day 4 task. Similar numbers of subjects across conditions employed trained strategies on the unprompted transfer task. It is important to note that across conditions, study techniques were employed less effectively during independent use than under training conditions.

Third, statistically significant differences did not emerge for study persistence (e.g., duration) on Day 4. Surprisingly, descriptive differences favored subjects in the control condition. Using a variety of four study activities appear to have maintained students' attention for longer periods than did the single method of systematic study. It is noteworthy that three minutes of additional study time invested by subjects in the control condition did not result in improved spelling performance. Traditional paper and pencil spelling activities are often: (a) irrelevant to the acquisition of spelling skill (Graham, 1983) and (b) completed with little cognitive engagement (Fulk, 1994).

Finally, no significant differences resulted among conditions on the posttest attribution measure on the numbers of items attributed to effort across academic tasks or specific to tasks in the spelling domain. These results support that performance differences are more readily influenced than long-standing attributional belief systems (e.g., Borkowski, Weyhing, & Carr, 1988; Kurtz 1989; Okolo, 1992). Difficulties related to the measurement of attributional beliefs (e.g., Elig & Frieze, 1979; Maruyama, 1982) may have prevented differences from being detected. Three sessions of attribution retraining may be insufficient to

effect attributions specific to the spelling domain as well as across academic domains in these adolescents with LD.

Limitations of this study include the small sample size and the modest statistical effects. Factors which may have contributed to the modest effects include: the rigorous control condition and the number of target words on Days 2-4. Four traditional study methods were selected as an appropriate control condition (Borkowski & Buchel, 1983). This differs from prior spelling research that employed free-study comparison conditions (e.g., Foster & Torgesen, 1983; Graham & Freeman, 1985).

Although, all subjects were identified as poor spellers by their resource teachers and achievement scores, considerable variability was observed on pretest scores (e.g. ranges from 0 to 80% correct). To control for prior knowledge and to prevent ceiling effects, word lists were lengthened to 13 items on Days 2-4. This is a large number of target words, particularly in view of research that recommends shortened lists for this population (e.g., Gettinger, Bryant, & Fayne, 1982) which may have effected the low percentages of words learned across conditions.

Despite the limitations of this investigation, however, performance differences did favor the strategy-attribution condition across training days. Additional research may be needed to support these results and to address additional questions related to the measurement and training of attributions. Questions regarding the student characteristics and conditions under which these interventions would be most effective may also be addressed.

Finally, long-term classroom interventions may be more suited to modify the long-standing attributional belief systems of adolescent students with LD.

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Table 1
Demographic Data by Condition

	Condition		
Variable	Traditional Control	Strategy Only	Strategy Attribution
Verbal IQ	93.6 (10.1)	88.3 (10.5)	92.0 (7.7)
Perf. IQ	95.0 (16.5)	96.3 (12.4)	91.6 (13.0)
Full IQ	93.6 (14.2)	91.0 (9.3)	91.0 (9.6)
Age	14.4 (.6)	14.7 (.8)	14.3 (.64)
Yrs in SpEd	5.3 (2.4)	5.0 (1.9)	4.3 (1.9)
% day in SpEd	35.4 (22.2)	42.4 (20.5)	38.9 (23.5)
Reading Ach Score	82.0 (11.1)	76.1 (12.0)	82.1 (11.6)
Math Ach Score	87.5 (11.1)	78.1 (9.2)	87.7 (12.5)
Spelling Ach Score	74.2 (7.1)	78.2 (15.5)	81.2 (10.3)
n	12	15	14

Table 2

Means And Percents Correct For Training Days And Transfer Task

	Conditions		
	Control	Strategy	Strategy-Attribution
Raw Score M Training Days	15.36	17.73	22.27
(SD)	(10.08)	(12.87)	(9.39)
% Correct Training Days	42%	49%	62%
Raw Score M Transfer Task	3.91	4.71	4.83
(SD)	(3.39)	(4.37)	(3.76)
% Correct Transfer Task	30%	36%	37%

Table 3

Numbers and Percents of Strategies Employed on Unprompted Generalization Task

	Spelling Strategy	Spelling Strategy Plus Attribution	Traditional Control
No Strategy	3 (20)	2 (14)	2 (16)
Trained Study	12 (80)	12 (86)	10 (83)
Total	15	14	12